



US006321776B1

(12) United States Patent
Pratt et al.(10) Patent No.: US 6,321,776 B1
(45) Date of Patent: Nov. 27, 2001

(54) DOUBLE DIAPHRAGM PRECISION THROTTLING VALVE

(76) Inventors: Wayne L. Pratt, 16028 N. 63rd St.,
Scottsdale, AZ (US) 85254; William
Michael Kolarik, 918 W. Wagon Wheel
Dr., Phoenix, AZ (US) 85021(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/556,208

(22) Filed: Apr. 24, 2000

(51) Int. Cl.⁷ F16K 31/44

(52) U.S. Cl. 137/312; 251/331

(58) Field of Search 251/331; 137/312

(56) References Cited

U.S. PATENT DOCUMENTS

4,901,751 * 2/1990 Story et al. 137/312

5,002,086 * 3/1991 Linder et al. 137/312

* cited by examiner

Primary Examiner—Kevin Lee

(74) Attorney, Agent, or Firm—Gregory J. Nelson

(57) ABSTRACT

A throttling valve assembly actuated by a stepper motor having a double diaphragm seal and integral throttling surface. The throttling surface interfaces to a mating orifice and port arrangement to provide a smooth control regime for various process fluids. Because of the unique design of the flow paths the fluids will remain in a laminar flow state throughout the throttling range, thus providing smooth and continuous response to the control input. The valve opening to the fluid controlled by a stepper motor through a direct drive mechanism. The embodiment shown here employs all PTFE construction for the wetting parts, but any material could be used that would be compatible with the process fluid. Additional features are minimal capture of the process fluid, free draining, and no metallic parts in close communication with the process fluid.

10 Claims, 5 Drawing Sheets

